

Business Driver

This Inquiry was originally initiated by DNR. DNR possess large amounts of LIDAR imagery and photogrammetry data that is used throughout the department.

Since then, CTS has identified several storage customers with a need for storage that has lower performance requirements than what is currently offered by the new VMAX. There are also opportunities for CTS to integrate this type of storage technology to help further lower the costs of existing services such as Backup and Archive. The data that would be stored is still high-value to the customer agencies, but is not very dynamic and is either seldom used, or used by a small number of customer staff.

These kinds of data span of a variety of usage models. Examples include video storage and streaming for dash cam and surveillance video, photogrammetry and imagery for GIS, imaging data for billing and electronic record keeping, virtual server snapshots for backup purposes, and data for litigation holds.

Several storage products that can support these usage models are available at attractive prices.

CTS Enterprise Storage is considering the procurement of a storage product that would be able to support these usage models. The intention is to add this as a new lower cost tier of storage which would augment our VMAX tiers. The most economical VMAX tier is 17¢ per gigabyte month. We're estimating that this new tier of storage could be sold for between 5¢ and 10¢ per gigabyte month.

Overview and Potential Benefits

Tier 4 storage technologies (often referred to as "Scale-Out NAS") can help CTS provide storage at price points lower than our least expensive offering. The procurement costs of this type of storage are roughly 2 to 8 cents per GB/Month, depending on the capacity purchased. Contrast that with VMAX storage where procurement costs are roughly 13 cents per GB/Month.

This storage technology can be used to support a variety of uses and services. For example, it could be used to archive data that has long retention periods but does not have the recovery requirements of backed up data. It can be used for taking server snapshots where management of the snapshot data is provided by the VM hypervisor rather than a specialized backup application, such as TSM. It can be used to store large, static files (such as video or imagery) inexpensively.

Tier 4 storage is more secure than cloud storage and easier to use. Tier 4 storage is on-premise, which is preferred for category 3 and 4 data. Cloud storage also requires a special interface to use, which often looks and feels different than the folder-based interface that is native to Microsoft Windows and is what most customers are accustomed to.

Tier 4 storage is characterized by low cost, low performance arrays of very inexpensive disk. Vendors typically use commodity components combined with their own data resiliency technologies. This enables them to be able to offer lower-prices in this class of storage but with the type of reliability that is essential to enterprise-class systems.

This is a very competitive space with offerings from most of the major storage players. Technical evolution is rapid and features normally seen in higher-end storage are starting to show up in this lower-cost tier.

Estimated Time to Implement:

Estimated time to implement is between 8 and 12 months.

Implementation is based upon the following assumptions:

- This storage can be purchased through WSCA, greatly reducing the acquisition timeline
- To mitigate current CTS resource constraints, it is assumed that CTS would use contractors/vendors for the bulk of the implementation work
- The implementation scope for usage of this type of storage is limited to Unstructured Data (no databases)
- Initial deployment would be limited to one or two usage models. Suggested examples are Imaging/Photogrammetry and Long-Term Data Retention (Archive).
- To shorten the requirements gathering timeline, the storage service owner will represent business requirements for potential services that could later be built upon this platform, for example alternatives to structured backups.

Timeline tasks:

- Validate Business Requirements and Prepare Conceptual Design – 9 Weeks
- Review Design and Service concept at the July Service Health Check
- Prepare the Service Design – 3 Weeks
 - Define the Service Offering(s)
 - Describe/Revise Rates, Recovery and Billing
 - Define Service Levels and Delivery Methods
- Review the Potential Service Offering(s) with the CTS Advisory Council

With acceptance of the Conceptual Design and Service Design, the following work would be necessary to complete implementation:

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- Evaluate Vendor Products & Select the solution – 4 Weeks
- Prepare High-Level Design – 4 Weeks
- Procure the Solution – 12 Weeks
- Implement, Validate and Deploy the solution – 10 Weeks

Staffing resources needed to support the project include Design, Project Management, Network Support, Facilities, Security, Storage and Customer SMEs.

Deployment:

Deployment would require support from the Security, Facilities and TSD teams to ensure secure connection to the CTS infrastructure and proper siting in the SDC. CTS Design and Storage staff would be required to design and implement the file system structure and security mechanisms. EPM/CSD Project Management would be required for project oversight and customer communications. The storage vendor would perform all of the installation, configuration and validation of the equipment and software. Deployment would require approximately 2000 hours or 1 FTE.

Support and Maintenance:

System administration of most of these storage products is fairly low. Initial setup and configuration take the most time, but in many cases, these activities have been simplified through the use of “wizards” and guided configuration routines. Many of these systems can be fully configured in less than a week. System configuration would be augmented by vendor staff to ensure a supportable configuration was in place.

Day- to-day administration then consists of monitoring workloads and capacities, on-boarding new customers, allocating storage space or making changes to customer configurations. M&O requirements represent approximately .25 of an FTE.

On-going maintenance would be performed by the vendor via a maintenance agreement.

Customer Administration:

Customer agencies would assume responsibility for managing their file structures and access permissions. Many customers indicate a preference to having control over the services they purchase from CTS. This type of self-administration has become a growing trend for most customer agencies and so is not seen as an imposition.

Client Installation and Troubleshooting:

In most cases this storage would just look like another file share for customers to place data. The key difference is that it would be slower than what they are currently accustomed to. It would take longer for files to be written and read to Tier 4 storage, and this would be exacerbated by very large file sizes. This tradeoff between price and performance will require proactive and regular management of customer expectations.

User Training:

Some additional training of CTS staff will be required in order to properly administer the new storage. We typically see training sessions of 3 to 5 days to provide staff with the education necessary to develop solid administrative skills.

Some initial training may be required for some customers. Customer administrator and user training would take a day, probably less due to the familiar usage paradigm that Tier 4 storage would present. We would develop training materials to assist customers with administering their environments. These materials are the same or very similar to what we would produce for internal use.

Estimated Costs:

Costs are largely dependent upon the amount of storage initially procured. Lower initial capacities will be more expensive than higher ones. As an example, purchasing 18TB of Tier 4 storage would cost about 8 cents per GB/Month amortized over 6 months (\$86,400). Purchasing 1PB of Tier 4 storage would cost about 1.3 cents per GB/Month (\$780,000).

System Cost:

These cost estimates are based on product quotes for Isilon storage. Isilon is a manufacturer of scale out storage arrays and a subsidiary of EMC.

This example is based on the costs of an Isilon NL400 populated with 12 trays of disk, totaling 1,038TB of usable capacity. It includes all hardware and software, installation and configuration services and 3 years of Platinum Support. Shipping is also included. Total cost for the NL400 is \$770,197.

Cost Items	Implementation Cost	Annual Operating Cost
Hardware & Software	Amortized over 60 months	\$154,039
Maintenance	3 years included	\$115,000*
Facilities, Connectivity	\$21,600	\$86,400
Other Support Services	\$13,650	\$54,600
Staff	\$98,875	\$24,636

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TOTAL	\$134,125	\$434,402

Support Costs:

Using the Isilon example above, the estimated cost for on-going vendor maintenance is approximately \$1,000 per month for the 18TB system or \$115,000 for the 1PB system. 3 years of support is included in the system cost above.

In 2012, Storage conducted an analysis of operating expenses versus procurement costs. On average, annual operating expenses were slightly less than twice (about 1.8 times) the annual cost of procurement, assuming that the total cost of a capital asset is amortized over 60 months. So an array supporting 18TB with a total purchase cost of \$86,400 would cost \$17,280 each year for 5 years. The total cost of operation would be about \$48,384 or \$4,032 per month, or 22 cents per GB/Month.

An array supporting 1PB with a total purchase cost of \$770,197 would cost \$154,039 each year for 5 years. The total cost of operation would be about \$434,000 or \$36,166 per month, or 3.4 cents per GB/Month.

These estimates assume that the array capacities are 100% sold.